

# Niobium-Based Intermetallics for Affordable In-Space Propulsion Applications, Phase I

Completed Technology Project (2005 - 2005)



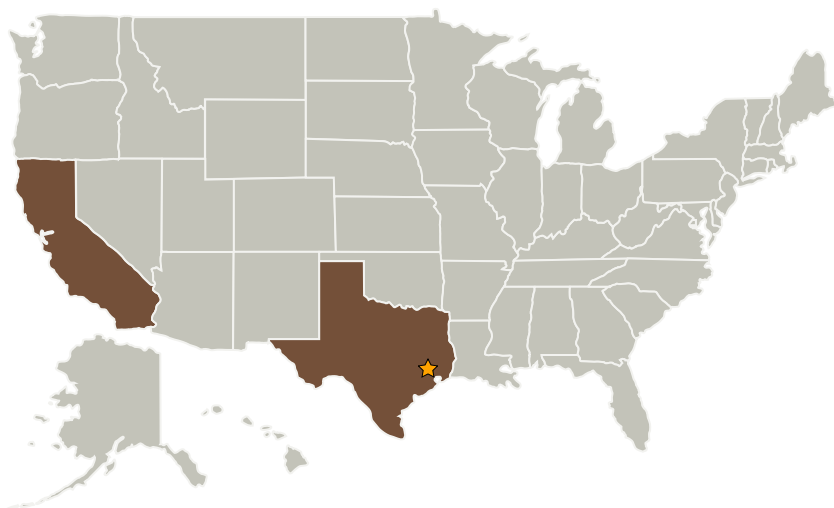
## Project Introduction

This SBIR Phase I effort proposes an innovative class of refractory metal intermetallic composites as alternatives to high temperature metallic materials presently used and/or considered for in-space propulsion components. In addition to a superior high temperature performance potential, these niobium-based intermetallics could offer significant cost savings over conventional refractory alloys, provided they can be affordably manufactured into near-net shapes. An advanced reactive metal casting technology is applied to produce the most sophisticated Nb-based intermetallic composite component shape ever attempted. Innovative shape processing techniques are needed for Nb-based intermetallics, since they are critical to manufacturing cost-effectiveness.

## Anticipated Benefits

Potential non-NASA commercial applications include replacement candidates for nickel-based superalloys and refractory alloys in high temperature and corrosion-resistant applications. Essentially, any application and/or industry that needs the superior strength-to-density of Nb-based intermetallics within relative affordability while possessing high temperature and corrosion-resistant physical properties superior to nickel-based superalloys could use this technology.

## Primary U.S. Work Locations and Key Partners



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## Table of Contents

Project Introduction	1
Anticipated Benefits	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Johnson Space Center (JSC)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Titech International, Inc.	Supporting Organization	Industry	Orange, California

## Primary U.S. Work Locations

California	Texas
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## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Project Managers:**

Michael Baine

Woodrow Whitlow

**Principal Investigators:**

John M Grunsfeld

Edward Chen

## Technology Areas

**Primary:**

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - └ TX12.4 Manufacturing
    - └ TX12.4.1 Manufacturing Processes